SESSION XXIV
SOLID WASTE REDUCTION/COMPOSTING

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POLLUTION PREVENTION AND SOLID WASTE MANAGEMENT AT VANDENBERG AIR FORCE BASE, CALIFORNIA

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Vandenberg AFB operates a Class III Sanitary Landfill (base landfill), and until recently, did not have management plans to effectively control waste acceptance from base personnel, contractors, and residents. To alleviate this situation, the 30th Space Wing at Vandenberg AFB has been aggressive in developing solid waste management programs that will reduce the amount of waste being disposed of in the base landfill, and that will emphasize pollution prevention through base-wide reuse, recovery and recycling. The 30th Civil Engineering Squadron Environmental Management Flight (30 CES/CEV), with the assistance of the Wing Environmental Services Contractor, Tetra Tech, Inc. (Tetra Tech), developed a Solid Waste Management Plan, accomplished a Green Waste Management Opportunity Assessment, and performed a Study for Increasing the Efficiency of Recycling Programs. This paper addresses the results of these important solid waste management documents and studies.

Solid Waste Management Plan (SWMP)

The Solid Waste Management Plan (SWMP) provides the framework of the solid waste management process at Vandenberg AFB, by establishing management roles and responsibilities, and reviewing the effectiveness of current solid waste methods and technologies in place: sanitary landfill, refuse collection, recycling programs, and a household hazardous waste program. The plan also provides an economic analysis of current disposal methods, and methods for implementation of the base-wide solid waste management process to address California and Air Force compliance directives and reduction goals.

As an overall base guidance document, the SWMP sets forth parameters to ensure that the base landfill will continue to operate in compliance with all federal, state, local, and Air Force requirements and remain a viable alternative for the management of future solid waste generation. The continued availability of a base landfill is essential to the future support of national space and missile programs; if waste disposal trends continued at current rates, the base

landfill would reach capacity in 2034, and alternative waste disposal sites, such as off-base landfills, would have to be considered.

To ensure that the base landfill remains a viable option for waste disposal through 2084, Vandenberg AFB must reduce and maintain waste disposal in the landfill by 24.7 percent per year from 1997 through 2000, the equivalent of reducing accepted waste by approximately 4,755 tons per year. To achieve this reduction of accepted waste, the following management practices have been implemented:

Green Waste Management Opportunity Assessment (OA) and Alternate Daily Cover (ADC)
Asphalt and Concrete Re-processing
Landfill Waste Acceptance Controls
Study to Increase the Efficiency of the Recycling Programs

Green Waste Management Opportunity Assessment (OA) and Alternate Daily Cover (ADC)

Historically, Vandenberg AFB generated a considerable amount of both C&D and green waste: 42,162 tons in 1995, 45,536 tons in 1996, and 30,257 tons in 1997.

The C&D waste is generated through the demolition and rebuilding of all military family housing (MFH) units, as well as the continued demolition of old Army facilities. In 1995, this demolition created an influx of 12,409 tons of C&D waste that were disposed of in the base landfill, and 29,575 tons of concrete and asphalt debris, which were diverted from the base landfill and stockpiled at a temporary staging area. For 1996, 16,978 tons were accepted and 25,051 tons were diverted.

Additionally, in 1995, some 4,178 tons of green waste were generated at Vandenberg AFB, with 2,048 tons accepted and 2,130 tons diverted. For 1996, 507 tons were accepted and 3,000 tons were diverted.

To address this issue, a Green Waste Management Opportunity Assessment (OA) evaluated the feasibility of a green waste processing facility at Vandenberg AFB. The evaluation was completed to assist Vandenberg AFB with meeting mandatory waste diversion goals, while adhering to regulatory requirements regarding disposal, facility design, and operation. The OA incorporated the following major components necessary to properly evaluate a green waste management system: green waste generation and characteristics, green waste product evaluation, and cost evaluation.

Four potential uses of processed green waste were identified: alternate daily cover (ADC) at the landfill, direct land application, landscape material, and soil amendment. The primary focus of the OA was ADC, since any green waste, and most C&D materials accepted in a Class III sanitary landfill, have the potential to be processed into ADC, which in California can be counted toward diversion.

Green waste product and cost evaluation was developed through a review of existing alternatives currently being used by other green waste management facilities. This information, combined with a general market assessment for green waste products in the local area, provided a basis for determining the best alternatives available to Vandenberg AFB for a green waste management facility. Facility cost information was included with the basic facility design and siting information to estimate the actual cost savings potential for Vandenberg AFB.

The recommendations in the OA include options that meet the current and future Vandenberg AFB green waste issues. The facility design considered two issues: ability to process large quantities of C&D/green waste for use as ADC; and to process clean green waste for uses such as land application and soil amendment. The facility design evaluation included process description, facility siting, and facility costs. A thorough study was also performed on the types of grinding equipment that should be used in the facility.

As a follow-on to the OA, an ADC project was implemented with the approval of all applicable regulatory agencies such as the CIWMB, the Santa Barbara County Air Pollution Control District, and the Santa Barbara County Department of Environmental Health Services, which is the Local Enforcement Agency (LEA). A 460 horse-power horizontal grinder has been placed at the landfill to convert structural C&D waste and green waste into ADC. The MFH units being demolished have undergone complete asbestos and lead-based paint abatement, however to ensure worker safety, and to avoid any potential adverse environmental impacts, the grinding operation includes monitoring of ambient air.

The ADC project is the beginning of other options to process and use green waste at the base landfill. Other possible uses of the green waste are as a base-wide non-indigenous plant abatement material (covering and smothering exotic plants), and for inclusion in a composting project. These projects comprise the many programs at Vandenberg AFB that are designed to divert waste from the base landfill and meet waste diversion goals.

Asphalt and Concrete Re-processing

Although diverted from the landfill, the asphalt and concrete rubble C&D waste are in themselves challenges for recycling programs. During its first two months of operation, the C&D/green waste grinder has also been used to process some 7,500 to 10,000 tons of asphalt debris, of which some has already been used as to repair roads damaged by winter storms. For the concrete rubble, a crusher is being employed to convert it to usable material, either in new construction projects or for use as rip-rap for drainage control and slope stability at the base landfill.

Landfill Waste Acceptance Controls

As a part of implementing the SWMP, the landfill scalehouse is being automated to better control and manage waste being accepted. Private vehicles and unauthorized contractors are now denied access. A tipping fee has been established for the adjoining Federal Penitentiary, which contributes some 12 percent of the total accepted waste. The purpose of the fee is to encourage

the establishment of a penitentiary recycling program, and to the amount of waste brought to the landfill: the fee increases at an exponential rate beyond an established base tonnage.

Study for Increasing the Efficiency of Recycling Programs

The purpose of this study was to evaluate the efficiency of the current material recovery and recycling operations at Vandenberg AFB, and to conduct an opportunity assessment to explore new and innovative ways of improving recycling programs and making them more cost effective. A cost/benefit analysis provided an economic comparison of the alternatives.

The study included: an evaluation of current recycling and recovery programs, and related aspects; alternative ways to enhance the recycling and recovery programs; an analysis of current participation in recovery and recycling programs through a survey questionnaire, and exploration of ways to increase participation; and an evaluation of the feasibility of recycling materials not in the current collection program. Study target groups were residential, institutional, commercial, and military, based on the differences in operational procedures, and generation of wastes, among these groups.

The waste streams evaluated in the study were separated into commercial, industrial, and residential. The Study focuses on only the recyclable portions of those waste streams. Recyclable materials do not include concrete and asphalt, green waste, asbestos, or hazardous materials/waste. Areas studied to increase the efficiency of the recycling programs included the development of a centralized drop-off center and educational programs. In addition, recycling of alternative materials such as toner cartridges, compact discs, and transparency film were evaluated.

Vandenberg AFB has a refuse and recycling contractor that collects refuse and recyclable materials from each building and residential areas on base. The evaluation of the centralized drop-off center included options for a contractor-operated center or a base-operated center. Options were also provided for manned and non-manned centers. The study recommended that if Vandenberg AFB was to construct a centralized drop-off center, it would be most effective to construct it at the base landfill. This location would provide extra convenience for contractors and base personnel to recycle bulk materials, such as cardboard, or large amounts of metals or plastic that may otherwise stockpile due to infrequent pick-ups by the refuse and recycling contractor. Construction contractors could bring C&D debris to this drop-off center to avoid disposal in the landfill. The MFH residents are already provided with weekly green waste pick-up service, and monthly bulk item pick-up service; therefore, they have opportunities to recycle commonly generated materials.

Although Vandenberg AFB has an educational program to promote recycling on base, the study recommended several options to expand the existing program. An educational program goes hand in hand with the development of any recycling system, including the construction of a centralized drop-off center. From the basewide survey, approximately 40 percent of the survey respondents suggested increasing the educational program as a way to improve and increase

recycling efforts; many of the additional comments made on the survey addressed educational programs.

The study recommends that educational materials be designed to accommodate all of the facilities on base including Air Force and contractor offices, family housing, dormitories, schools, chapels, and recreational facilities. As there is a constant turnover at Vandenberg AFB in all areas of the base, continued education is the key to ensure constant and consistent participation in recycling programs.

Data from the survey indicated that participation in the recycling programs is high; however, responses indicated that paper, cardboard, and aluminum are the most frequently recycled materials. Other materials such as glass, plastics, and magazines are not frequently recycled. This could be interpreted in that either these materials are not being used in a quantity as high as the others, or people are unaware that these materials are recyclable. Regardless, if the base population was aware of the types of items that are recyclable, the rate of recycling these materials could increase. Educational programs recommended include developing a newsletter or some type of publication to be distributed basewide on a regular basis, displaying promotional posters, and/or having training sessions to educate the public about recycling.

Educational materials should also be developed to promote source reduction and affirmative procurement programs, and provide guidelines for the people who make purchasing decisions. Information on hazardous materials alternatives should also be included to promote the purchase of environmentally friendly products. The study recommended the development of an in-house hazardous materials exchange similar to other hazardous materials exchanges in California.

Final recommendations from the study included contract expansion and development of a solid waste functional area. Contracts covering any function on base that would generate types of recyclable waste including office materials, manufacturing, process, maintenance, or C&D waste should be expanded to include explicit provisions to make every effort possible to recycle or reuse wastes. Many contractors are not required to evaluate the waste streams in terms of recyclable or reusable materials. A solid waste functional area manager could be responsible for combining and managing all of the alternatives discussed in this study to ensure that the programs are integrated and remain effective, and enforce and monitor recycling efforts.

Conclusion and Way Ahead

The solid waste management programs at Vandenberg AFB are highly integrated and are geared to work towards achieving waste diversion goals as well as providing pollution prevention programs. For example, in 1997, C&D/ green waste comprised 74 percent of the total solid waste generated at Vandenberg AFB, with 34 percent accepted into the landfill and 40 percent diverted. For the first quarter of 1998, C&D/green waste comprised 77.6 percent of the total solid waste generated; however, only 10.6 percent was accepted and 67 percent was diverted. For the first time, the volume of diverted materials has exceeded that of the accepted waste, which resulted in the elimination of regulatory fees associated with accepted tonnage.

A Recycling Outreach Program has recently been initiated to follow-through on implementing the educational recommendations of the Study for Increasing the Efficiency of Recycling Programs. In addition, process green waste has been effectively used in an ongoing effort to abate non-indigenous plant species.

The pollution prevention and solid waste management programs discussed in this paper help to solve some the problems that arise involving resource recovery and recycling by recommending alternative solid waste management technologies and methods. Each individual entity at Vandenberg AFB is responsible for managing solid waste generated from their organization and each entity should strive to communicate with one another and work together to achieve solid waste management goals. The solid waste programs developed for Vandenberg AFB look beyond financial incentives to achieve base-wide environmental excellence.

REFERENCES

Tetra Tech, Inc.
Green Waste Management Opportunity Assessment. Task Assignment No. 69, Vandenberg Air Force Base, California. May 1997.
Tetra Tech, Inc.
Study for Increasing the Efficiency of Recycling Programs at Vandenberg Air Force Base. Task Assignment No. 226, Vandenberg Air Force Base, California. August 1997.
U.S. Air Force
1997 Solid Waste Management Plan. Vandenberg Air Force Base, California. July 1997.